

1638



1600

#7

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/035,060A

DATE: 10/17/2002

TIME: 09:47:55

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw

3 <110> APPLICANT: Edwards, David L.
 4 Hernstadt, Corinna
 5 Wilcox, Edward R.
 6 Wong, Siu-Yin
 8 <120> TITLE OF INVENTION: Process for Altering the Host Range of *Bacillus*
thuringiensis Toxins, and
 9 Novel Toxins Produced Thereby
 11 <130> FILE REFERENCE: M12C1FDF3D2
 13 <140> CURRENT APPLICATION NUMBER: US 10/035,060A
 14 <141> CURRENT FILING DATE: 2001-12-27
 16 <150> PRIOR APPLICATION NUMBER: US 09/405,788
 17 <151> PRIOR FILING DATE: 1999-09-27
 19 <150> PRIOR APPLICATION NUMBER: US 08/855,160
 20 <151> PRIOR FILING DATE: 1997-05-13
 22 <150> PRIOR APPLICATION NUMBER: US 08/580,781
 23 <151> PRIOR FILING DATE: 1995-12-29
 25 <150> PRIOR APPLICATION NUMBER: US 08/420,615
 26 <151> PRIOR FILING DATE: 1995-04-10
 28 <150> PRIOR APPLICATION NUMBER: US 08/097,808
 29 <151> PRIOR FILING DATE: 1993-07-27
 31 <150> PRIOR APPLICATION NUMBER: US 07/980,128
 32 <151> PRIOR FILING DATE: 1992-11-23
 34 <150> PRIOR APPLICATION NUMBER: US 07/803,920
 35 <151> PRIOR FILING DATE: 1991-12-06
 37 <150> PRIOR APPLICATION NUMBER: US 07/356,599
 38 <151> PRIOR FILING DATE: 1989-05-24
 40 <150> PRIOR APPLICATION NUMBER: US 06/904,572
 41 <151> PRIOR FILING DATE: 1986-09-05
 43 <150> PRIOR APPLICATION NUMBER: US 06/808,129
 44 <151> PRIOR FILING DATE: 1985-12-12
 46 <160> NUMBER OF SEQ ID NOS: 9
 48 <170> SOFTWARE: PatentIn version 3.1
 50 <210> SEQ ID NO: 1
 51 <211> LENGTH: 3531
 52 <212> TYPE: DNA
 53 <213> ORGANISM: *Bacillus thuringiensis*
 55 <400> SEQUENCE: 1
 56 atggataaca atccgaacat caatgaatgc attccttata attgtttaag taaccctgaa 60
 58 gtagaagtat taggtggaga aagaatagaa actggttaca cccaatcga tatttccttg 120
 60 tcgctaacgc aatttcctttt gagtgaattt gttcccggtg ctggatttgt gttaggacta 180
 62 gttgatataa tatggggaat ttttggtccc tctcaatggg acgcatttct tgtacaaatt 240
 64 gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta 300
 66 gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat 360
 68 cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc 420

RECEIVED

OCT 25 2002

TECH CENTER 1600/2900

ENTERED

RAW SEQUENCE LISTING

DATE: 10/17/2002

PATENT APPLICATION: US/10/035,060A

TIME: 09:47:55

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw

70	cttacaaccg	ctattcctct	ttttgcagtt	caaaattatc	aagttcctct	tttatcagta	480
72	tatgttcaag	ctgcaaattt	acattttatca	gttttgagag	atgtttcagt	gtttggacaa	540
74	aggtagggat	ttgatgccgc	gactatcaat	agtcgttata	atgatttaac	taggcttatt	600
76	ggcaactata	cagattatgc	tgtacgctgg	tacaatacgg	gattagaacg	tgtatgggga	660
78	ccggtattcta	gagattgggt	aagggtataat	caatttagaa	gagaattaac	actaactgta	720
80	ttagatatcg	ttgctctgtt	cccgaattat	gatagtagaa	gatatccaat	tcgaacagtt	780
82	tcccaattaa	caagagaaat	ttatacaaac	ccagtattag	aaaattttga	tggtagtttt	840
84	cgaggctcgg	ctcagggcac	agaaagaagt	attaggagtc	cacatttgat	ggatatactt	900
86	aacagtataa	ccatctatac	ggatgctcat	aggggttatt	attattggtc	agggcatcaa	960
88	ataatggctt	ctcctgtagg	gttttcgggg	ccagaattca	cttttcgct	atatggaact	1020
90	atgggaaatg	cagctccaca	acaacgtatt	gttgcacaac	taggtcaggg	cgtgtataga	1080
92	acattatcgt	ccactttata	tagaagacct	tttaatatag	ggataaataa	tcaacaacta	1140
94	tctgttcttg	acgggacaga	atttgcttat	ggaacctcct	caaatttgcc	atccgctgta	1200
96	tacagaaaaa	gcggaacggg	agattcgcgtg	gatgaaatac	cgccacagaa	taacaacgtg	1260
98	ccacctaggc	aaggatttag	tcctcgatta	agccatgttt	caatgtttcg	ttcaggcttt	1320
100	agtaatagta	gtgtaagtat	aataagagct	ccaacgtttt	cttggcagca	tcgcagtgc	1380
102	gaatttaata	atataattcc	ttcatcacaa	attacacaaa	tacctttaac	aaaactact	1440
104	aatcttggct	ctggaacttc	tgtcgtttaa	ggaccaggat	ttacaggagg	agatattctt	1500
106	cgaagaactt	cacctggcca	gatttcaacc	ttaagagtaa	atattactgc	accattatca	1560
108	caaagataatc	gggtaagaat	tcgtacgct	tctactacaa	atttacaatt	ccatacatca	1620
110	attgacggaa	gacctattaa	tcagggtaat	ttttcagcaa	ctatgagtag	tgaggagta	1680
112	ttacagtccg	gaagctttag	gaotgtaggt	tttactactc	cgtttaactt	ttcaaagtga	1740
114	tcaagtgtat	ttacgttaag	tgtcatgttc	ttcaattcag	gcaatgaagt	ttatatagat	1800
116	cgaattgaat	ttgttccggc	agaagtaacc	tttgaggcag	aatatgattt	agaaagagca	1860
118	caaaaggcgg	tgaatgagct	gtttacttct	tccaatcaaa	tcgggtttaa	aacagatgtg	1920
120	acggattatc	atattgatca	agtatccaat	ttagttgagt	gtttatcaga	tgaattttgt	1980
122	ctggatgaaa	aacaagaatt	gtccgagaaa	gtcaaactg	cgaagcgact	tagtgatgag	2040
124	cgaattttac	ttcaagatcc	aaacttcaga	gggatcaata	gacaactaga	ccgtggctgg	2100
126	agaggaaagta	cggatattac	catccaagga	ggcgatgacg	tattcaaaga	gaattacgtt	2160
128	acgtatttgg	gtacctttga	tgagtgtat	ccaacgtatt	tatatcaaaa	aatagatgag	2220
130	tcgaaaattaa	aagcctatac	ccgttatcaa	ttaagagggt	atctcgaaga	tagtcaagac	2280
132	ttagaaatct	atttaattcg	ctacaatgca	aaacatgaaa	cagtaaatgt	gccaggtagc	2340
134	ggttccttat	ggcgcctttc	agcccaaggt	ccaatcggaa	agtgtggaga	gccgaatcga	2400
136	tgcgcgccac	accttgaatg	gaatcctgac	ttagattgtt	cgtgtaggga	tggagaaaag	2460
138	tgtgcccatc	attcgcacac	tttctcctta	gacattgatg	taggatgtac	agacttaaat	2520
140	gaggacctag	gtgtatgggt	gatcttttaag	attaagacgc	aagatgggca	cgcaagacta	2580
142	gggaatctag	agttttctcg	agagaaacca	ttagtaggag	aagcgctagc	tcgtgtgaaa	2640
144	agagcggaga	aaaaatggag	agacaaacgt	gaaaaattgg	aatgggaaac	aaatatcgtt	2700
146	tataaagagg	caaaagaatc	tgtagatgct	ttatttgtaa	actctcaata	tgatcaatta	2760
148	caagcggata	cgaatattgc	catgattcat	gcggcagata	aacgtgttca	tagcattcga	2820
150	gaagcttata	tgcctgagct	gtctgtgatt	ccgggtgtca	atgcggctat	ttttgaagaa	2880
152	ttagaagggc	gtattttcac	tgcattctcc	ctatatgatg	cgagaaatgt	cattaaaaat	2940
154	ggtgatttta	ataatggctt	atcctgctgg	aacgtgaaag	ggcatgtaga	tgtagaagaa	3000
156	caaaacaacc	aacgttcggg	ccttgttctt	ccggaatggg	aagcagaagt	gtcacaagaa	3060
158	gttcgtgtct	gtccgggtcg	tggtatatat	cttcgtgtca	cagcgtacaa	ggagggatat	3120
160	ggagaagggt	gcgtaaccat	tcctgagatc	gagaacaata	cagacgaact	ggagtttagc	3180
162	aactgcgtag	aagaggaaat	ctatccaaat	aacacggtaa	cgtgtaatga	ttatactgta	3240
164	aatcaagaag	aatacggagg	tgcgtacact	tctcgtaatc	gaggatataa	cgaagctcct	3300
166	tccgtaccag	ctgattatgc	gtcagtcctat	gaagaaaaat	cgtatacaga	tggacgaaga	3360

RAW SEQUENCE LISTING

DATE: 10/17/2002

PATENT APPLICATION: US/10/035,060A

TIME: 09:47:55

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw

```

168 gagaatcctt gtgaatttaa cagagggtat agggattaca cgccactacc agttgggttat 3420
170 gtgacaaaag aattagaata cttcccagaa accgataagg tatggattga gattggagaa 3480
172 acggaaggaa catttatcgt ggacagcgtg gaattactcc ttatggagga a 3531
175 <210> SEQ ID NO: 2
176 <211> LENGTH: 1177
177 <212> TYPE: PRT
178 <213> ORGANISM: Bacillus thuringiensis
180 <400> SEQUENCE: 2
182 Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu
183 1 5 10 15
186 Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
187 20 25 30
190 Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
191 35 40 45
194 Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
195 50 55 60
198 Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
199 65 70 75 80
202 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
203 85 90 95
206 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
207 100 105 110
210 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
211 115 120 125
214 Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
215 130 135 140
218 Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
219 145 150 155 160
222 Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
223 165 170 175
226 Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
227 180 185 190
230 Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val
231 195 200 205
234 Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
235 210 215 220
238 Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
239 225 230 235 240
242 Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro
243 245 250 255
246 Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
247 260 265 270
250 Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu
251 275 280 285
254 Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
255 290 295 300
258 Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln
259 305 310 315 320
262 Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro

```

RAW SEQUENCE LISTING

DATE: 10/17/2002

PATENT APPLICATION: US/10/035,060A

TIME: 09:47:55

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw

```

263          325          330          335
266 Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala
267          340          345          350
270 Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
271          355          360          365
274 Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp
275          370          375          380
278 Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
279 385          390          395          400
282 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
283          405          410          415
286 Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
287          420          425          430
290 Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile
291          435          440          445
294 Arg Ala Pro Thr Phe Ser Trp Gln His Arg Ser Ala Glu Phe Asn Asn
295          450          455          460
298 Ile Ile Pro Ser Ser Gln Ile Thr Gln Ile Pro Leu Thr Lys Ser Thr
299 465          470          475          480
302 Asn Leu Gly Ser Gly Thr Ser Val Val Lys Gly Pro Gly Phe Thr Gly
303          485          490          495
306 Gly Asp Ile Leu Arg Arg Thr Ser Pro Gly Gln Ile Ser Thr Leu Arg
307          500          505          510
310 Val Asn Ile Thr Ala Pro Leu Ser Gln Arg Tyr Arg Val Arg Ile Arg
311          515          520          525
314 Tyr Ala Ser Thr Thr Asn Leu Gln Phe His Thr Ser Ile Asp Gly Arg
315          530          535          540
318 Pro Ile Asn Gln Gly Asn Phe Ser Ala Thr Met Ser Ser Gly Ser Asn
319 545          550          555          560
322 Leu Gln Ser Gly Ser Phe Arg Thr Val Gly Phe Thr Thr Pro Phe Asn
323          565          570          575
326 Phe Ser Asn Gly Ser Ser Val Phe Thr Leu Ser Ala His Val Phe Asn
327          580          585          590
330 Ser Gly Asn Glu Val Tyr Ile Asp Arg Ile Glu Phe Val Pro Ala Glu
331          595          600          605
334 Val Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val
335          610          615          620
338 Asn Glu Leu Phe Thr Ser Ser Asn Gln Ile Gly Leu Lys Thr Asp Val
339 625          630          635          640
342 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Glu Cys Leu Ser
343          645          650          655
346 Asp Glu Phe Cys Leu Asp Glu Lys Gln Glu Leu Ser Glu Lys Val Lys
347          660          665          670
350 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn
351          675          680          685
354 Phe Arg Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr
355          690          695          700
358 Asp Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val
359 705          710          715          720

```

RAW SEQUENCE LISTING

DATE: 10/17/2002

PATENT APPLICATION: US/10/035,060A

TIME: 09:47:55

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw

```

362 Thr Leu Leu Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln
363           725           730           735
366 Lys Ile Asp Glu Ser Lys Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg
367           740           745           750
370 Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
371           755           760           765
374 Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp
375           770           775           780
378 Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg
379 785           790           795           800
382 Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg
383           805           810           815
386 Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile
387           820           825           830
390 Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile
391           835           840           845
394 Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu
395           850           855           860
398 Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys
399 865           870           875           880
402 Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu
403           885           890           895
406 Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe
407           900           905           910
410 Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met
411           915           920           925
414 Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu
415           930           935           940
418 Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu
419 945           950           955           960
422 Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn
423           965           970           975
426 Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val
427           980           985           990
430 Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu
431           995           1000           1005
434 Val Leu Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val
435           1010           1015           1020
438 Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu
439           1025           1030           1035
442 Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn
443           1040           1045           1050
446 Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr
447           1055           1060           1065
450 Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu
451           1070           1075           1080
454 Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu
455           1085           1090           1095
458 Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys

```

RAW SEQUENCE LISTING ERROR SUMMARY DATE: 10/17/2002
PATENT APPLICATION: US/10/035,060A TIME: 09:47:56

Input Set : A:\EP.txt
Output Set: N:\CRF4\10172002\J035060A.raw

Invalid Line Length:

The rules require that a line not exceed 72 characters in length. This includes spaces.

Seq#:1; Line(s) 8

VERIFICATION SUMMARY

DATE: 10/17/2002

PATENT APPLICATION: US/10/035,060A

TIME: 09:47:56

Input Set : A:\EP.txt

Output Set: N:\CRF4\10172002\J035060A.raw